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10/551,100

09/26/2005

Vidar Snekkenes

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EXAMINER

CALANDRA, ANTHONY J

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|--|---|--|
| Office Action Summary | Application No. 10/551,100 | Applicant(s) SNEKKENES ET AL. | |
| | Examiner ANTHONY J. CALANDRA | Art Unit 4128 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 September 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☒ Claim(s) 4 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Detailed Office Action

1. The communication dated 09/26/2005 has been entered and fully considered.
2. Claims 1-12 are currently pending.

Priority

3. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Objections

4. Claim 4 is objected to because of the following informalities: The word ‘stem’ should be ‘steam’.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As for claim 1, applicant recites the element of the remaining free acidic fluid fraction exceeds 10% which is unclear and the examiner is unable to properly determine the meets and bounds of the protection that the applicant seeks. It is not clear whether the 10% more fluid is by weight or by volume. It is further unclear whether the 10% refers to 10% more fluid on total weight/volume of the chips and fluid or 10% more on weight/volume of the fluid. Finally, “free acidic fluid” fraction does not have a well defined meaning. “Free acidic fluid” fraction could

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refer to either only the fluid surrounding the chips or it could refer to the both the fluid surrounding the chips plus fluid in the chips but not strongly bound (fluid can be mechanically pressed out). For purpose of examination examiner has interpreted the “free acidic fluid fraction” to be based on weight and only the fluid surrounding the chips. Claims 2-12 are dependant on claim 1.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. Claim 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 4,475,984 CAEL, hereinafter CAEL, in further view of U.S. Patent 5,587,049 MARZOLINI et al., hereinafter MARZOLINI et al., and U.S. Patent 6,203,662 SNEKKENES et al., hereinafter SNEKKENES et al.

10. As for claim 1, CAEL discloses a process for delignifying cellulose using monopersulfuric acid or salt thereof pretreatment followed by a kraft pulping [column 2 lines 12-

16 and 23-25]. CAEL discloses adding monopersulfate to the chips, at a liquor ratio of 7.6 to 1 which is a fluid fraction greater than 50% (*exposing the chips to an acidic treatment device by adding an acidic treatment fluid to establish an, acidic slurry having a fluid fraction exceeding 50%*;[see e.g. column 4 lines 14-15 and lines 39-40]). CAEL further discloses that the chips are drained of monopersulfate solution where the examiner has interpreted drained to have removed substantially all the free monopersulfate acid (*draining the chips from the acidic slurry so that the drained chips obtain a remaining free acidic fluid fraction that does not exceed 10%*; [see e.g. column 2 line 23]).

CAEL et al. does not disclose that the acidic monopersulfate solution is recycled or that only the amount of retained acid is added to the chips. MARZOLINI et al. discloses a process for delignifying cellulose using a monopersulfate solution with recycle of the fluid to the first step of acid treatment and adding the correct amount of monopersulfate restored by a new addition (*adding additional acidic treatment fluid to the acidic treatment device only in a replacement amount that corresponds, to an amount of acidic fluid that is retained in the drained chips*;[see e.g. abstract, column 2 lines 48-50, column 3 lines 29-30]). Examiner notes that that the lignocellulose can have the acid extracted to the high consistency of 30% which the examiner has interpreted as a low amount of free liquor [see e.g. claim 1].

At the time of invention it would have been obvious to a person of ordinary skill in the art to perform the monopersulfate treatment of CAEL using the recycling technique of MARZOLINI et al. A person of ordinary skill in the art would have been motivated to recycle to conserve chemicals and improve the pulp properties as suggested by MARZOLINI et al. [see e.g. column 2 lines 55-60].

CAEL discloses that following the monopersulfate treatment is a traditional kraft cook. The traditional kraft cook disclosed by CAEL does not suggest the 2 different temperature treatments as required in the instant claims. SNEKKENES et al. discloses an improved kraft cooking process over a traditional ITC kraft process which is superior to traditional ITC kraft cooking [improved process following steps 1-3 giving multiple benefits; see e.g. column 1 lines 45-65]. The process has a steaming vessel heating the chips to one temperature with steam, (*heating the drained chips by steam to a first temperature* [see e.g. steaming vessel 20B]) and then is followed by a second step where heating is done with a high sulfidity alkaline extraction liquor with a temperature of 100-160 deg C (*heating the drained chips to a second temperature not exceeding 140 °C while adding an alkali impregnation liquid the second temperature being higher than the first temperature.*[see e.g. column 5 lines 4-17]) This range of temperatures overlaps the instant claimed temperature range of below 140 deg C. The reference further teaches that the impregnation temperature is preferably below 140 deg C [column 5 line 35-36]. Further, the second temperature is stated to be higher than the steaming vessel temperature as SNEKKENES states the chips are further heated in the impregnation vessel implying a higher temperature after the steaming vessel [column 5 lines 11-13].

At the time of the invention it would have been obvious to a person of ordinary skill in the art to combine the monopersulfate treatment of CAEL, with the recycling of reagents of MARZOLINI et al. with the improved kraft cooking process of SNEKKENES et al. A person of ordinary skill in the art would be motivated to use the kraft process of SNEKKENES et al. instead of the traditional kraft process of CAEL because the improved kraft process of

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SNEKKENES et al. leads to reduced H-factor, reduced consumption of chemicals, better heat economy, and better pulp properties [see e.g. column 1 lines 58-65].

11. As for claim 2, SNEKKENES et al. discloses as part of the kraft process the chips are heated by a warm alkali impregnation liquid [see e.g. column 5 lines 4-17]).

12. As for claim 3, SNEKKENES et al. discloses part of the kraft process the chips are heated by a warm alkali impregnation liquid [see e.g. column 5 lines 4-17]). SNEKKENES further discloses that a traditional screen can be provided if desired [column 3 lines 35-36]. With a traditional screen in center of the impregnation vessel, chips would flow downward in the vessel. Alkaline impregnation fluid would flow down concurrently with the chips above the screen while alkaline impregnation fluid would flow counter currently to chips below the screen.

13. As for claim 4, SNEKKENES et al. discloses that the chips are sent to the steaming vessel (20B) where they are heated by steam and then sent to the impregnation vessel where they contact the alkali in the impregnation vessel and form a liquid and chip slurry (1) [Figure 1 and column 5 lines 4-17].

14. As for claim 5, MARZOLINI et al. discloses that a monopersulfate treatment of lignocellulose has a pH of approximately 1.2 which is one specific point which falls within the instant claimed range [column 3 line 23].

15. As for claim 6, MARZOLINI et al. discloses that the monopersulfate is recycled back to the first treatment stage therefore there is no loss of acidic treatment fluid in excess of what accompanies the chips and adding the correct amount of monopersulfate restored by a new addition [see e.g. abstract, column 2 lines 48-50, column 3 lines 29-30].

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16. As for claim 7, 8, and 9 SNEKKENES et al. discloses as part of the kraft process the chips are heated by a warm alkali impregnation liquid which is extracted black liquor[column 5 lines 4-17]). Extracted black liquor has a sulfidity of .15-25 mol/liter and low in NaOH as evidenced applicants specification [pg.7 lines 24-33, pg. 8 lines 1-10]. Examiner has interpreted a sulfidity of 0.15-0.25 mol/liter to be a sulfide rich liquor. SNEKKENES describes the black liquor as having an NaOH content of 13-30 g/L, 0.4 – 1.0 mol/liter, which overlaps with the claimed range of less than 0.75 moles/liter.

17. As for claim 10, CAEL discloses a treatment time of about 30 minutes to 3 hours [column 3 lines 5-10] but does not teach away from the lower time range because 20 minutes is about 30 minutes. At the time of invention it would have been obvious to a person of ordinary skill in the art to optimize the acidic pretreatment temperature to effect the delignification and yield of the cellulose [see e.g. MPEP 2144.05 II B]. Furthermore, MARZOLINI teaches that the acid treatment can range from about 5 minutes to 90 minutes which overlaps with the instant claimed range of 1-20 minutes [column 2 lines 61-67].

18. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable U.S. Patent 4,475,984 CAEL, hereinafter CAEL, in further view of U.S. Patent 5,587,049 MARZOLINI et al., hereinafter MARZOLINI et al., and U.S. Patent 6,203,662 SNEKKENES et al., hereinafter SNEKKENES et al., as applied to claim 1-10 above, and in further view of U.S. Patent 5,338,366 GRACE et al., hereinafter GRACE et al.

CAEL teaches that monopersulfate can be added for treatment of chips, which necessarily occurs in a vessel, at temperatures of 40 to 80 deg C [column 3 lines 10-11]. CAEL fails to teach how the monopersulfate solution is heated to this range. GRACE et al. teaches us

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that acid solutions can be heated by a heat exchanger from 54 to 65 deg C [column 3 lines 61-62 column 4 lines 20-27]. At the time of the invention it would have been obvious to a person of ordinary skill in the art to heat the acid solution of CAEL with the heat exchanger of GRACE et al. The use of a heat exchanger is well within the capability of a person of ordinary skill in the art. A person of ordinary skill in the art would be motivated to use a heat exchanger to heat the acid solution to the desired temperature of CAEL if the purchased acid solution was cold. An indirect heater would be preferable to a direct steam heater as to prevent the wasting of steam condensate or the ability to use low grade waste heat streams to heat the acid solution at low cost.

19. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 4,475,984 CAEL, hereinafter CAEL, in further view of U.S. Patent 5,587,049 MARZOLINI et al., hereinafter MARZOLINI et al., in further view of U.S. Patent 6,203,662 SNEKKENES et al., hereinafter SNEKKENES et al. as applied to claim 1-10 above, and as further evidenced by METSO valve document.

As for claim 12, SNEKKENES et al. discloses that the chips enter into a steaming vessel in the cooking process (20B) [Figure 1]. SNEKKENES does not teach the temperature of the steaming vessel. However, a typical steaming vessel heats chips to about 120 deg C as evidenced by METSO valve document [pg 2 column 2] which renders the instant claimed range obvious.

Conclusions

20. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Patent 3,841,962 PROCTER et al. discloses a process for generating H₂S using CO₂ gas and high sulfidity liquor. CO₂ dissolved in water forms carbonic acid which reacts with the high sulfidity liquor to form H₂S [column 2 lines 10-30].

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANTHONY J. CALANDRA whose telephone number is (571)270-5124. The examiner can normally be reached on Monday through Friday, 7:30 AM-5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Barbara Gilliam can be reached on (571) 272-1330. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Barbara L. Gilliam/
Supervisory Patent Examiner, Art Unit
4128

AJC